Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-38. (Canceled)

39. (Currently amended) A method for examining an object, the method comprising acts of:

introducing magnetic particles into at least part of a target area of an object under examination;

generating a spatially inhomogeneous magnetic field in the target area, wherein the magnetic field in a first part-area in the target area has a first magnetic field strength that keeps the magnetic particles in the first part-area in a non-saturated state, and wherein the magnetic field in a second part-area in the target area has a second magnetic field strength that keeps the magnetic particles in the second part-area in a saturated state;

generating a superposed oscillating or rotating magnetic field at least partially in the first part-area having a low magnetic

field strength to cause at least some magnetic particles to oscillate or rotate;

irradiating the target area with electromagnetic radiation;

detecting electromagnetic radiation from the irradiated target area, wherein detected electromagnetic radiation includes at least one of reflected electromagnetic radiation and scattered electromagnetic radiation, which is modulated by interaction with rotating or oscillating magnetic particles in the target area; and

determining at least one of an intensity, absorption and polarization of the detected electromagnetic radiation as a function of a change in rotation or oscillation of the magnetic particles due to the modulation of the detected electromagnetic radiation.

40. (Previously presented) The method as claimed in claim 39, comprising acts of:

changing a relative, spatial position of the first and second part-areas in the examination area to locally change a magnetization of the particles; and

detecting and evaluation signals which depend on the magnetization in the examination area that are influenced by the

changing relative, spatial position of the first and second part-area to obtain information about at least one of a spatial distribution and change in the spatial distribution of the magnetic particles in the examination area.

41. (Previously presented) The method as claimed in claim 39, wherein the magnetic particles include at least one of superparamagnetic particles with an effective anisotropy, ferromagnetic monodomain particles with an effective anisotropy sufficient for the particles to behave in a superparamagnetic manner only in a suspension, soft-magnetic particles having an anisotropy, and hard-magnetic particles.

42. (Previously presented) The method as claimed in claim 39, wherein the magnetic particles are in a liquid, viscous or gel-like shell in the examination area or are introduced into said shell.

43. (Previously presented) The method as claimed in claim 39, wherein the electromagnetic radiation includes at least one of microwave, infrared, VIS, ultraviolet and X-ray radiation.

44. (Previously presented) The method as claimed in claim 39, wherein at least one optical contrast agent, in particular a fluorescent contrast agent, is introduced into or present in the examination area.

45. (Previously presented) The method as claimed in claim 39, wherein at least one of the scattered and reflected electromagnetic radiation is detected and evaluated in a direction-dependent manner.

46. (Previously presented) The method as claimed in claim 39, wherein determining an intensity of the detected electromagnetic radiation comprises an act of determining a change in intensity as a function of an oscillation mode or a rate of rotation.

47. (Previously presented) The method as claimed in claim 39, wherein the examination area is irradiated with electromagnetic radiation of at least one specific wavelength or wavelength spectrum.

48. (Previously presented) The method as claimed in claim 39, wherein the examination area is irradiated using a radiation source comprising at least one optical fiber integrated in a catheter or an endoscope.

49. (Previously presented) The method as claimed in claim 39, comprising an act of:

moving the first part-area having a low magnetic field strength by at least one of actuating and moving a coil arrangement or when the part-area having a low magnetic field strength is stationary, moving the examination object or moving the examination object and the first part-area having a low magnetic field strength relative to one another at the same time.

50. (Currently amended) An apparatus for examining an object, comprising:

at least one device for generating a magnetic field in a target area of an object under examination, wherein the magnetic field is a magnetic gradient field having a first magnetic field strength in a first part-area in the target area that keeps magnetic particles in the first part-area in a non-saturated state,

and wherein the magnetic gradient field has a second magnetic field strength in a second part-area in the target area that keeps magnetic particles in the second part-area in a saturated state;

at least one radiation source for generating electromagnetic radiation to irradiate the target area;

at least one detector for detecting electromagnetic radiation from the irradiated target area, wherein detected electromagnetic radiation includes at least one of reflected electromagnetic radiation and scattered electromagnetic radiation, which is modulated by interaction with magnetic particles in the target area; and

an evaluation unit for processing the detected radiation signals to determine at least one property of the detected electromagnetic radiation as modulated by the interaction with the magnetic particles.

51. (Previously presented) The apparatus as claimed in claim 50, wherein the at least one device for generating a magnetic field generates a magnetic field that changes the relative, spatial position of the first and second part-areas in the target area to

locally change the magnetization of the particles, the apparatus further comprising:

a magnetic field detector for detecting signals which depend on the magnetization in the target area that are influenced by the local change; and

a second evaluating unit to evaluate the signals detected by the magnetic field detector to obtain information about the spatial distribution of the magnetic particles in the target area.

52. (Previously presented) The apparatus as claimed in claim 50, wherein the at least one device for generating a magnetic field comprises a gradient coil arrangement for generating a magnetic gradient field in the first part-area of the target area which reverses its direction and has a zero crossing.

53. (Previously presented) The apparatus as claimed in claim 50, wherein the at least one device for generating a magnetic field comprises a device for generating a temporally changing magnetic field that is superposed on the magnetic gradient field to change a spatial position of the first and second part-areas in the target area.

54. (Previously presented) The apparatus as claimed in claim 50, wherein the magnetic field detector comprises a coil arrangement for receiving signals induced by the temporal change in the magnetization in the target area.

55. (Previously presented) The apparatus as claimed in claim 50, wherein the at least one device for generating a magnetic field comprises a device for generating at least a first and second magnetic field that are superposed on the magnetic gradient field, where the first magnetic field changes slowly in time and with a high amplitude and where the second magnetic field changes rapidly in time and with a low amplitude.

56. (Previously presented) The apparatus as claimed in claim 55, wherein the two magnetic fields run essentially perpendicular to one another in the target area.

57. (Previously presented) The apparatus as claimed in claim 50, further comprising at least one of a monochromator, chopper and

polarizer disposed between the radiation source and the target area.

58. (Previously presented) The apparatus as claimed in claim 50, wherein the radiation source is a laser.

59. (Previously presented) The apparatus as claimed in claim 50, further comprising at least one of an analyzer and a monochromator disposed between the at least one detector detector and the target area.

60. (Previously presented) The apparatus as claimed in claim 59, wherein the analyzer is a polarization filter.

61. (Previously presented) The apparatus as claimed in claim 50, wherein the at least one detector is a camera.

62. (Previously presented) The apparatus as claimed in claim 50, wherein the at least one detector is coupled to at least one of a camera and the evaluation unit.

63. (Previously presented) The apparatus as claimed in claim 62, wherein the evaluation unit comprises a microprocessor.